Check List the journal of biodiversity data

NOTES ON GEOGRAPHIC DISTRIBUTION

Check List 14 (5): 817–821
https://doi.org/10.15560/14.5.817

PENSOFT

First record of *Myotis riparius* Handley, 1960 (Chiroptera, Vespertilionidae) in Sergipe, northeastern Brazil

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Abstract
Myotis riparius Handley, 1960 was captured in 2 areas of Atlantic Forest in Sergipe, in northeast Brazil, filling the gaps of occurrence of this species in the region. This record expands the richness of bats in the state to 55 species.

Key words
Atlantic Forest; bats; distribution; new record.

Academic editor: Valeria Da Cunha Tavares | Received 7 June 2018 | Accepted 15 September 2018 | Published 5 October 2018

Citation: Bocchiglieri A, Bezerra RHS (2018) First record of *Myotis riparius* Handley, 1960 (Chiroptera, Vespertilionidae) in Sergipe, northeastern Brazil. Check List 14 (5): 817–821. https://doi.org/10.15560/14.5.817

Introduction

Myotis Kaup, 1829 is a genus of bats of the Vespertilionidae that is widely distributed (Wilson 2008) and represented in Brazil by 9 species: *M. albescens* (É. Geoffroy, 1806), *M. dinellii* Thomas, 1902, *M. izecksohni* Moratelli, Peracchi, Dias & Oliveira, 2011, *M. lavali* Moratelli, Peracchi, Dias & Oliveira, 2011, *M. levis* (I. Geoffroy, 1824), *M. nigricans* (Schinz, 1821), *M. riparius* Handley, 1960, *M. ruber* (É. Geoffroy, 1806), and *M. simus* Thomas, 1901 (Bianconi and Pedro 2017). Members of this genus can be identified by the presence of 3 pairs of upper premolars (Wilson 2008).

Myotis riparius has a large distribution range in the Neotropical region, distributing from the south of Honduras to South America, occurring in Colombia, Venezuela, Guyana, French Guiana, Brazil, Ecuador, Peru, Bolivia, Trinidad and Tobago, Paraguay, Uruguay, and Argentina (Simmons 2005, Wilson 2008). In Brazil, this species has been identified in areas of the Atlantic Forest, Caatinga, Amazonian Forest, and Cerrado (Paglia et al. 2012); it has been reported in the states of Acre, Amazonas, Amapá, Pará, Tocantins, Mato Grosso, Mato Grosso do Sul, Bahia, Ceará, Maranhão, Paraíba, Pernambuco, Piauí, and in the southeastern and south region of the country (Willig and Mares 1989, Dias and Peracchi 2007, Cáceres et al. 2008, Dias et al. 2009, Gregorin et al. 2011, Carvalho et al. 2013, Dos Santos et al. 2013, Maas et al. 2013, Garcia et al. 2014, Lourenço et al. 2014, Loureiro and Gregorin 2015). We report the first record of *M. riparius* for the state of Sergipe, northeastern Brazil.

Methods

Two male adult specimens were collected in 2 areas of the Atlantic Forest in Sergipe, northeastern Brazil, by using mist nets (9 × 3 m, 20 mm mesh) which remained open from sunset and closed 6.5 hours later, with permission for capture and collection, numbers 54957-1 (SISBIO) and 032000-01737/2012-8 (SEMARH-SE). The first area, Refúgio de Vida Silvestre Mata do Junco,

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is located in the municipality of Capela and has an area of 1520 ha, characterized as a semideciduous forest that present as secondary forest remnants and open areas, being the region of the source of the Lagartixo river. Antropic actions in the area, such as the removal of trees, give the locality patches of vegetation in different stages of succession (Santos et al. 2007). The climate is megathermal subhumid and the surrounding matrix is composed of sugarcane plantations (Souza-Alves et al. 2014). The second area, Reserva Particular do Patrimônio Natural do Caju, is located in the south coast of Sergipe, in the municipality of Itaporanga D'Ajuda, and has an area of 763 ha (Braghini and Vilar 2013). The area presents a mosaic of vegetation of restinga, mangrove and hypersaline tidal flats (apicum) (EMBRAPA 2013). The vegetation of restinga forest is little dense, with trees reaching 15 m, developing in soil of marine quartz sands (Mélo Filho et al. 1982). The climate is tropical megathermal (Alvares et al. 2013) and the surrounding region is characterized by the shrimp farming, vegetable extractivism, and urban expansion (Braghini and Vilar 2013).

After capture, the specimens were fixed in 10% formalin and preserved in 70% alcohol. The skulls were removed and cleaned, and deposited in the Coleção de Mamíferos da Universidade Federal de Sergipe (CMUFS). The body and cranial measurements were obtained with a digital caliper with precision of 0.05 mm. The specimens were identified according to López-González et al. (2001), Wilson (2008), and Novaes et al. (2017).

Results

New records. Brazil: Sergipe: Refúgio de Vida Silvestre Mata do Junco (10°32′ S, 037°03′ W, ca 160 m elev.): Capela municipality, coll. by Brito, DV & Bocchiglieri, A, 16 March 2013, 1 adult male, CMUFS 145. This specimen was captured on a trail within a semideciduous forest area at 22:30 h.

Brazil: Sergipe: Reserva Particular do Patrimônio Natural do Caju (11°06′43″ S, 037°11′12″ W, 8 m elev.): Itaporanga D'Ajuda municipality, coll. by Bezerra, RHS, Oliveira, TS & Jesus, PLB, 29 March 2017, 1 adult male (Fig. 1), CMUFS 291. This specimen was captured at 18:00 h within an area of arboreal restinga on a trail near a temporary pond.

Identification. Each specimen presented a medium-sized body when compared to other *Myotis* species. They were typified by long woolly fur with weakly bicolored brownish dorsal hairs, and bicolor ventral coloration with a brown base and yellowish-brown tips, and further characterized by the plagiopatagium that was attached to the foot at the level of the base of the toes and the absence of a fringe of hairs along the edge of uropatagium (Fig. 1). The specimens have moderately developed sagittal and lambdoidal crests. In these specimens we observed that the second upper premolar was displaced to the lingual side (Fig. 2), which is in agreement with López-González et al. (2001).

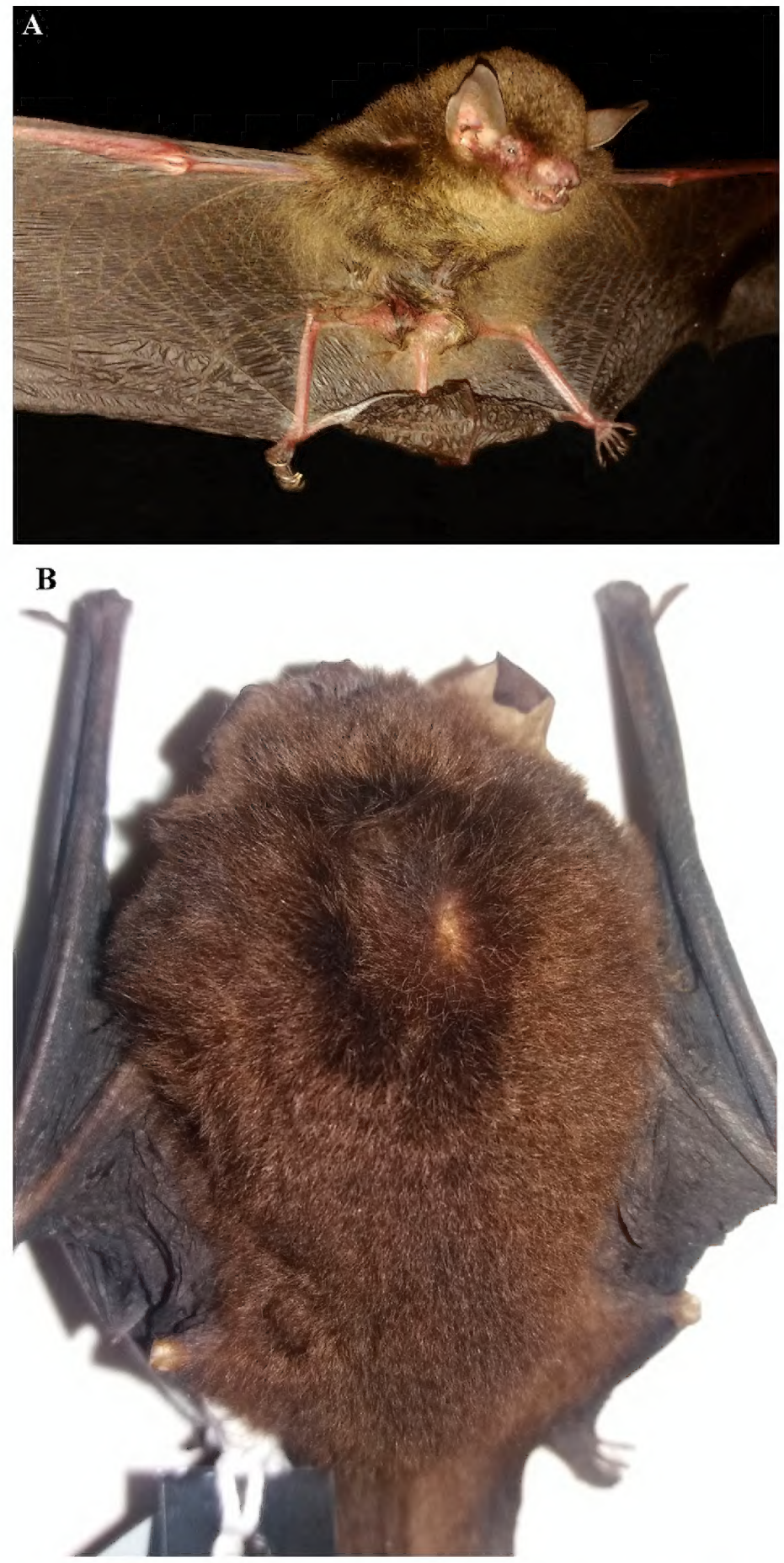

Figure 1. Male of *Myotis riparius* (CMUFS 291) from Reserva Particular do Patrimônio Natural do Caju, Sergipe, Brazil. **A.** Ventral view. **B.** Dorsal view.

Myotis riparius can be distinguished from *M. nigricans*, *M. levis*, and *M. albescens* by the presence of a sagital crest in the skull, and from *M. ruber* because the fur on the uropatagium does not occur until the knee. It differs from *M. simus* by the presence of more long fur and a post orbital constriction that is less than 3.8 mm (Wilson 2008). *Myotis riparius* is smaller than *M. izecksohni* with a generally long and narrow skull, and differs from *M. lavali* by weakly bicolored dorsal fur and a slightly narrowed skull than *M. lavali* (Moratelli et al. 2011).

The specimens in Sergipe presented a forearm length at 34.19 mm (to CMUFS 291) and 35.90 mm (CMUFS 145) and is in agreement with reported measurements, for example, by Vicente et al. (2005), Dias and Peracchi (2007), Lourenço et al. (2010), and Novaes et al. (2017). The ratio

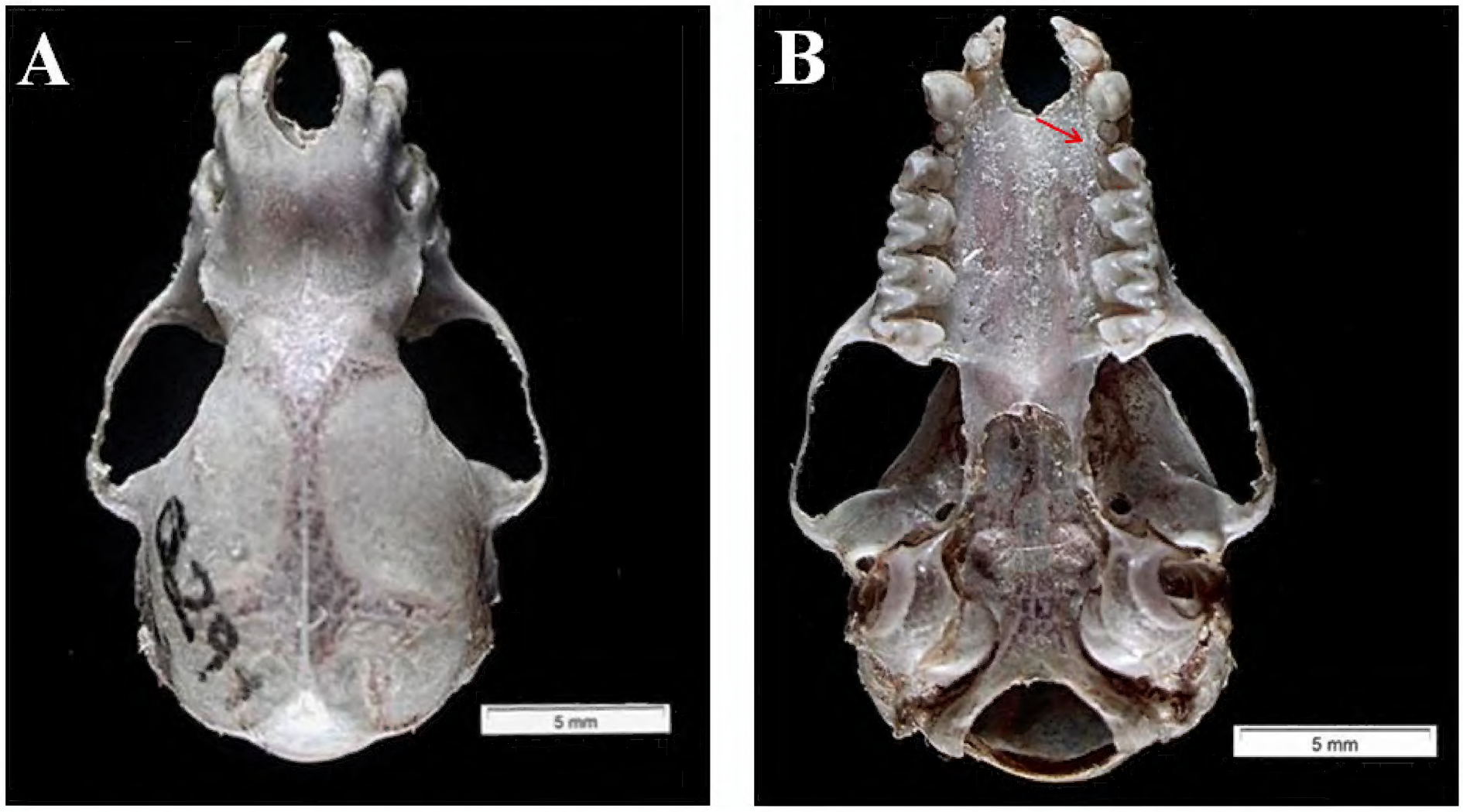

Figure 2. Skull of a male of *Myotis riparius* (CMUFS 291) from Reserva Particular do Patrimônio Natural do Caju, Sergipe, Brazil. **A.** Dorsal view. **B.** Ventral view. The red arrow indicates P2 in the lingual position.

Table 1. External and skull measurements of males of *Myotis riparius*. The body mass is expressed in grams and the morphological measurements are in millimeters. Measurements: FAL = forearm length; GLS = total skull length; LCI = condyloincisive length; LMX = maxillary toothrow length; POB = postorbital breadth; ZYB = zygomatic breadth; BBC = breadth of braincase; LMA = length of mandible; LMD= mandibular toothrow length. *: male and female together.

Measurements	Simmons and Voss (1998)	Lim et al. (1999)	López-González et al. (2001)*	Dias and Peracchi (2007)	Novaes et al. (2017)*	This study
FAL	33.5–36.0	36–39	31.5–36.4	35.04–35.14	32.3–39.8	34.19–35.9
GLS	13.83–14.32	13.8–14.6	13.2–14.3	13.78–13.98	13.2–15.2	13.42–13.50
LCI	13.33–13.92	—	—	13.22	12.1–14.3	13.07–13.24
LMX	5.21–5.59	5.2–5.5	4.8–5.4	5.28–5.30	4.7–5.7	5.3–5.4
POB	3.22–3.59	3.4–3.7	—	3.66	3.1–3.9	3.50–3.51
ZYB	8.91–9.51	9.0–9.5	8.3–8.9	8.44–8.76	8.2–10.0	8.95–9.10
BBC	6.57–6.77	—	6.3–7.2	6.54–6.70	6.0–7.0	6.71–6.85
LMA	—	—	—	9.66–9.78	9.3–11.0	9.8–10.0
LMD	—	—	4.8–5.8	5.76–5.94	5.1–6.1	5.95–6.0
Weight	4.8-6.2	5-6	—	—	4-7	5

between the breadth across the canines and the postorbital constriction is over 1.0 (1.06), diagnostic features reported by López-González et al. (2001) and Dias and Peracchi (2007). Other body and cranial measurements were similar (Table 1) to those reported by Simmons and Voss (1988), Lim et al. (1999), López-González et al. (2001), Dias and Peracchi (2007), and Novaes et al. (2017).

Discussion

Myotis riparius occurs in varied environments, from open and forested habitats to altered areas, undergoing large habitat plasticity (Novaes et al. 2017). The capture of the individual in the Reserva Particular do Patrimônio Natural do Caju, in an area associated with bodies of water, corroborates that reported by other studies, as this species is usually found in humid forested areas, foraging in environments close to water sources (e.g. Dias and Peracchi 2007, Wilson 2008, Lourenço et al. 2010, Maas et al. 2013, Tavares et al. 2017). The record of this species in areas of restinga has also been described in southern and southeastern Brazil by Luz et al. (2009) and Bôlla et al. (2017).

Myotis riparius is one of the most recorded species of aerial insectivores in understorey vegetation (Simmons and Voss 1998, Marques et al. 2016) and frequently coincides with other *Myotis* species (e.g. Simmons and Voss 1998, López-González et al. 2001, Dias and Peracchi 2008, Lourenço et al. 2010, Gregorin et al. 2011). In the 2 areas where it was recorded in Sergipe, this species coexisted with *M. lavali*.

In northeastern Brazil, *M. riparius* was documented in areas of Amazonian forest, Cerrado, Caatinga, and Atlantic Forest (Fig. 3). Our new records in Sergipe help fill

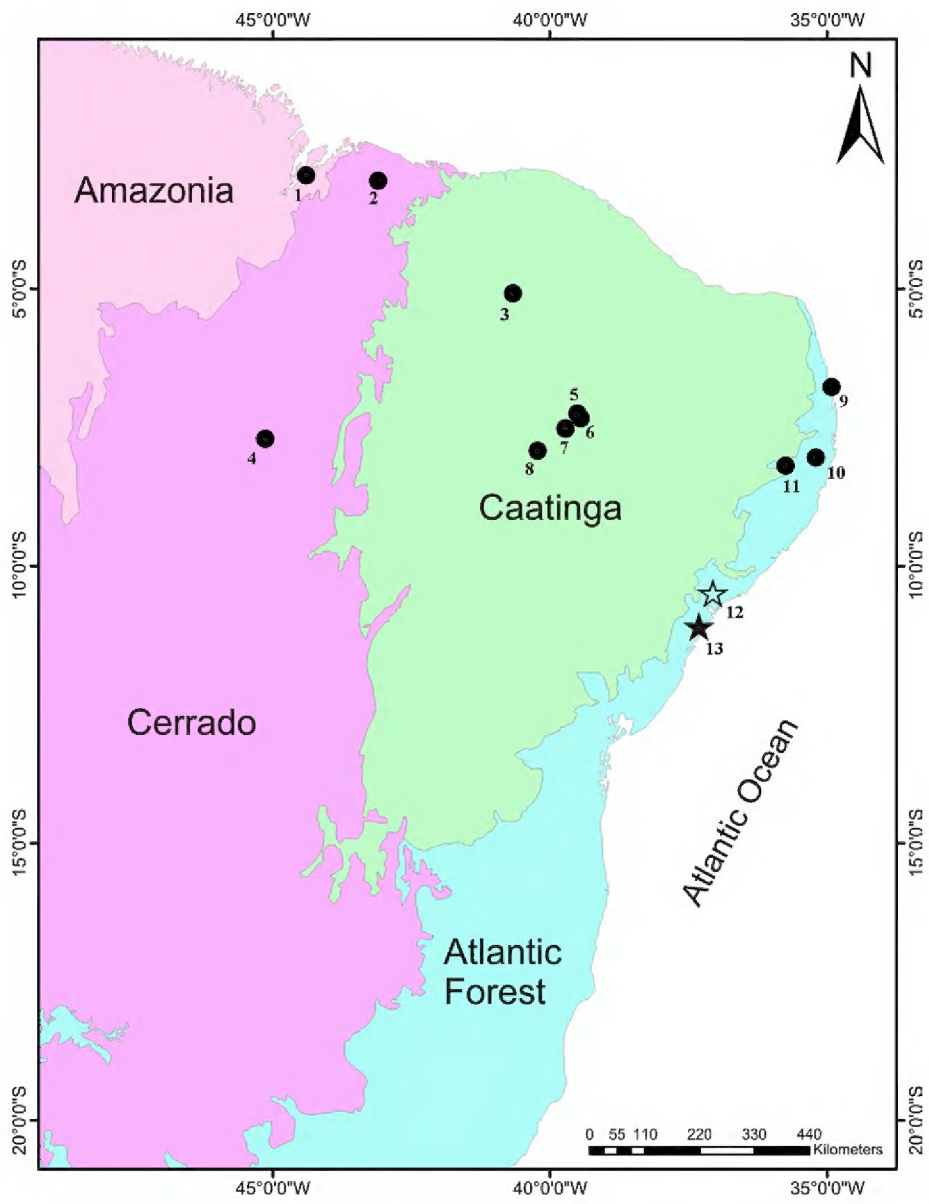

Figure 3. Distribution map of the known localities for *Myotis riparius* in northeastern Brazil. 1: Bacabeira, Maranhão (02°57′ S, 044°24′ W; Dias et al. 2009); 2: Barreirinhas, Maranhão (03°0′ S, 043°6′ W; Dos Santos et al. 2013); 3: Serra das Almas, Ceará (05°05′ S, 040°50′ W); 4: Ribeiro Gonçalves, Piauí (07°41′49″ S, 045°08′14″ W; Maas et al. 2013); 5: Aeroporto de Crato, Ceará (07°14′50″ S, 039°30′13.2″ W; Willig and Mares 1989); 6: FLONA Araripe-Apodé, Ceará (07°20′12.9″ S, 039°26′42″ W; Willig and Mares 1989); 7: Fazenda Batente, Pernambuco (07°30′50.4″ S, 039°43′06.9″ W; Willig and Mares 1989); 8: Fazenda Saco, Pernambuco (07°54′59.9″ S, 040°12′59.5″ W; Willig and Mares 1989); 9: APA Barra de Mamanguape, Paraíba (06°46′ S, 034°55′ W; Feijó and Langguth 2011); 10: Estação Ecológica do Tapacurá, Pernambuco (08°02′27.2″ S, 035°11′46.5″ W; Willig and Mares 1989); 11: Fazenda São José, Pernambuco (08°10′49.7″ S, 035°44′35.2″W; Willig and Mares 1989). The stars represents the new record in Sergipe (10°32′ S, 037°03′W and 11°06′43″ S, 037°11′12″W).

distribution gaps of this species in northeastern of Brazil, and expands the chiropterofauna to 55 species in the state (Rocha et al. 2017, Soares et al. 2017, Rocha et al. 2018).

Acknowledgements

We thank EMBRAPA Tabuleiros Costeiros, SEMARH/SE, FAPITEC/SE-CAPES (019.203.01181/2011-2; 2417/2013; 1941/2017) and the Universidade Federal de Sergipe (UFS) for logistical and financial support, CAPES for the fellowship for RHSB, Marcelo F.G. de Brito (UFS) for map production, and the students of the Laboratório de Mastozoologia (UFS) for helping us in the field campaigns.

Authors' Contributions

AB and RHSB collected and identified the specimens and wrote the text.

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